iCapstone – Adapting Schön's Theory to WIL

1:45pm – 2:45pm

Presented by:

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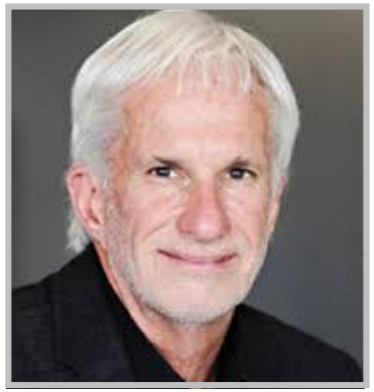
WATERLOO CO-OPERATIVE EDUCATION

BATA INNOVATION LAB

FullSoul Souled for good

We gratefully acknowledge the contributions and support from

Jim Russell



Dr. Rocco Fondacaro

Judene Pretti

Philipe Bezaire

Christina Hassan

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O.G. Nespoli, A. Hurst and J. Russel, “Facilitating Need Finding and Problem Formulation During Cooperative Work Terms Through Virtual Instruction – Pilot Implementation Results”, DESIGN 2018, Dubrovnik, Croatia, May 2018.

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World-Leading Creative Problem Solving

- Technicians solve **well-defined** problems
- Technologists solve **broadly-defined** problems
- Graduates solve **complex, open-ended** problems
- World-leading graduates demonstrate **confidence and competence** in engaging with **messy, indeterminate situations**

Donald Schön reminds us that the problems of real world practice are not well-defined

"they tend not to present themselves to practitioners as problems at all but as **messy** indeterminate situations"

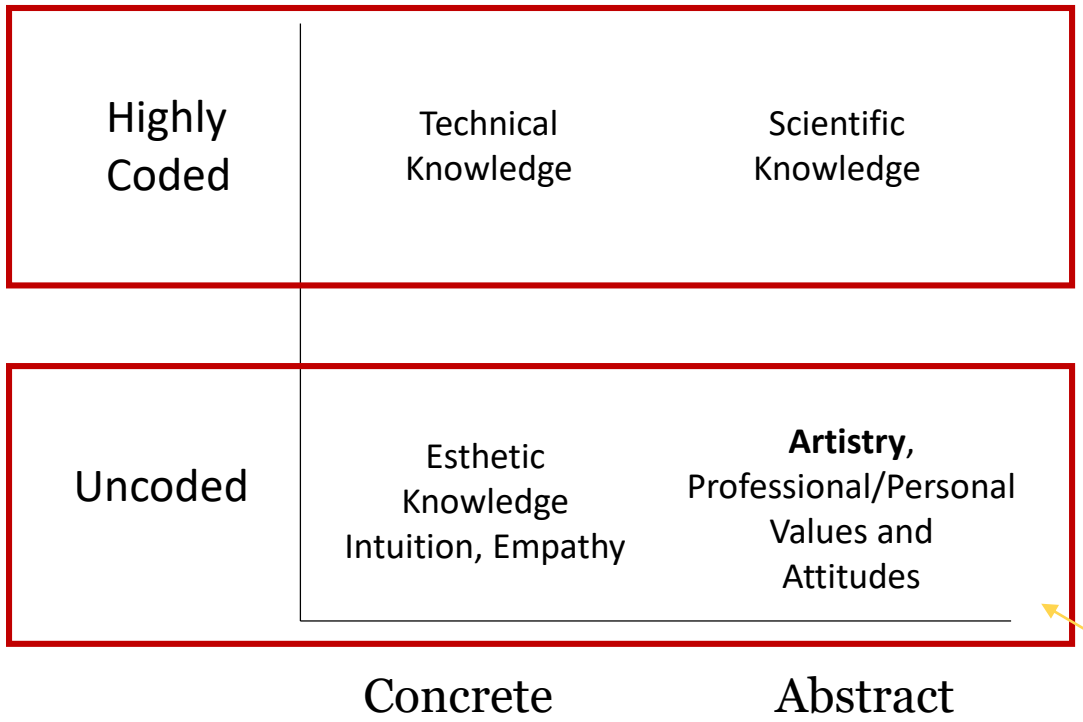
- Stay on the "**high ground**" of **technical rationality** to solve unimportant problems according to prevailing standards of rigor?, or

- Descend to the "**swamp**" of **important problems** and non-rigorous inquiry?

Addressing indeterminate zones of practice requires uncoded knowledge that is difficult to teach as it is embedded in practice

Knowledge provided by the modern day **university**

Knowledge gained by expert **practitioners**



Not by internalizing a stock of knowledge in a **mechanistic** way

A result of '**enskilment**' that comes from being actively engaged in a practice environment

Epistemology (E) - Space

This key skill – engaging with the practice environment, or what Schön terms **reflective practice** is best exemplified in **design**

J.V. Henderson, "Comprehensive, Technology-Based Clinical Education: The 'Virtual Practicum'", 1998

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We asked ourselves the following overarching research questions

1. To what extent can need finding and problem formulation be taught, learned and assessed during co-operative work terms?

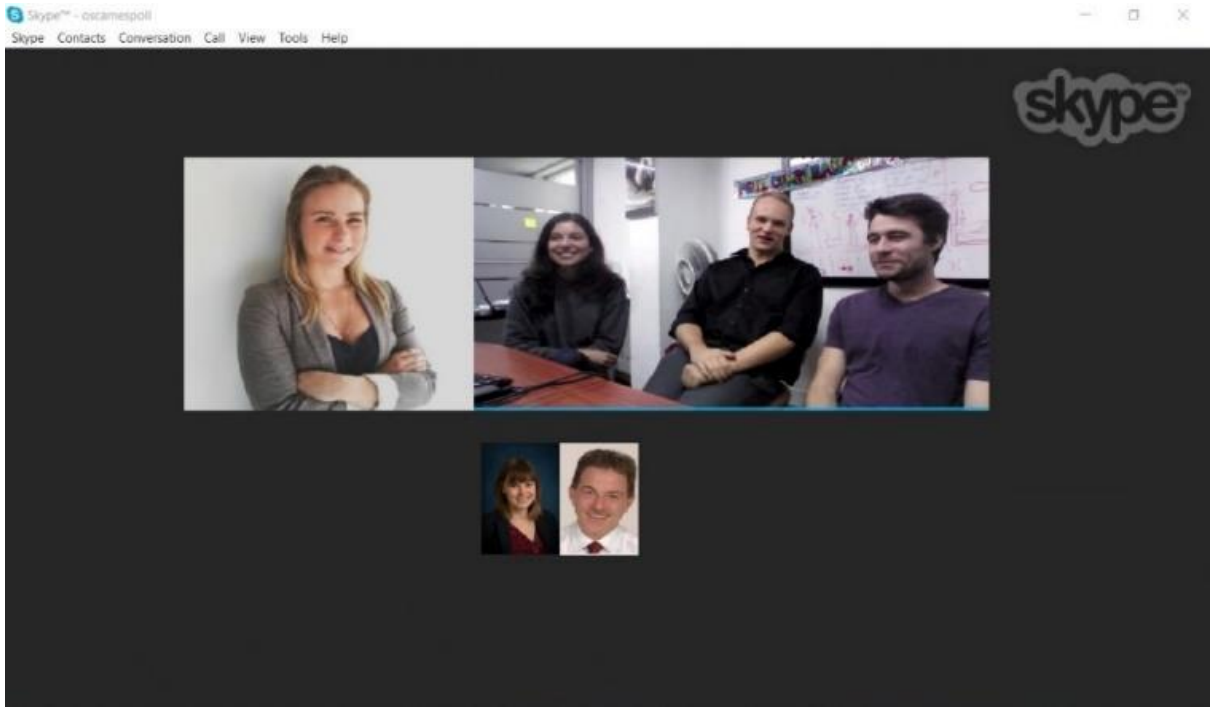
2. How can clinical instruction, through the application of Schön's theory of reflective practice, facilitate this?

Bata Innovation Lab was approached to hire an interdisciplinary team of co-op students and place them in an opportunity rich context

- Bata sought to introduce **disruptive** and innovative thinking
- Management team looking for **innovative approaches** and willing to make investments
- Students acted as **consultants** and were charged with need finding and **proposing** significant problems to solve

Learning sessions were conducted at the end of each week during their lunch break

- Learning was facilitated using both structured and **un-structured** approaches
  - Few lectures
  - Mostly opportunistic teaching as problems unfolded
  - **'Just-In-Time Learning'**
- Students were asked to individually **reflect** on their problem
  - What unfolded that was **expected**
  - What unfolded that was **unexpected** and surprising



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Student feedback was collected through individual open-ended surveys followed by a focus group

1. Lack of project definition at the beginning of the term

Advantages

- Target “real need” in the organization
- Autonomy and responsibility
- Match project to skills
- Increased engagement

Disadvantages

- Management resistance
- Time consuming process
- Unable to see implementation

Student feedback was collected through individual open-ended surveys followed by a focus group

2. Limited direct supervision of students

Advantages

- Able to evaluate various company areas
- Autonomy to choose project and make project decisions
- Ease of communication with workers

Disadvantages

- Conflicting departmental goals and priorities
- Impact on project communication

Student feedback was collected through individual open-ended surveys followed by a focus group

3. Virtual instruction and learning sessions

Advantages

- Synchronous instruction via video conference
- Familiar technology
- “Practical and useful” content
- Tools to define and formalize problems
- Opportunity to reflect

Disadvantages

- Related to connection quality
- Some increase in workload

Student feedback was collected through individual open-ended surveys followed by a focus group

3. Virtual instruction

Advantages

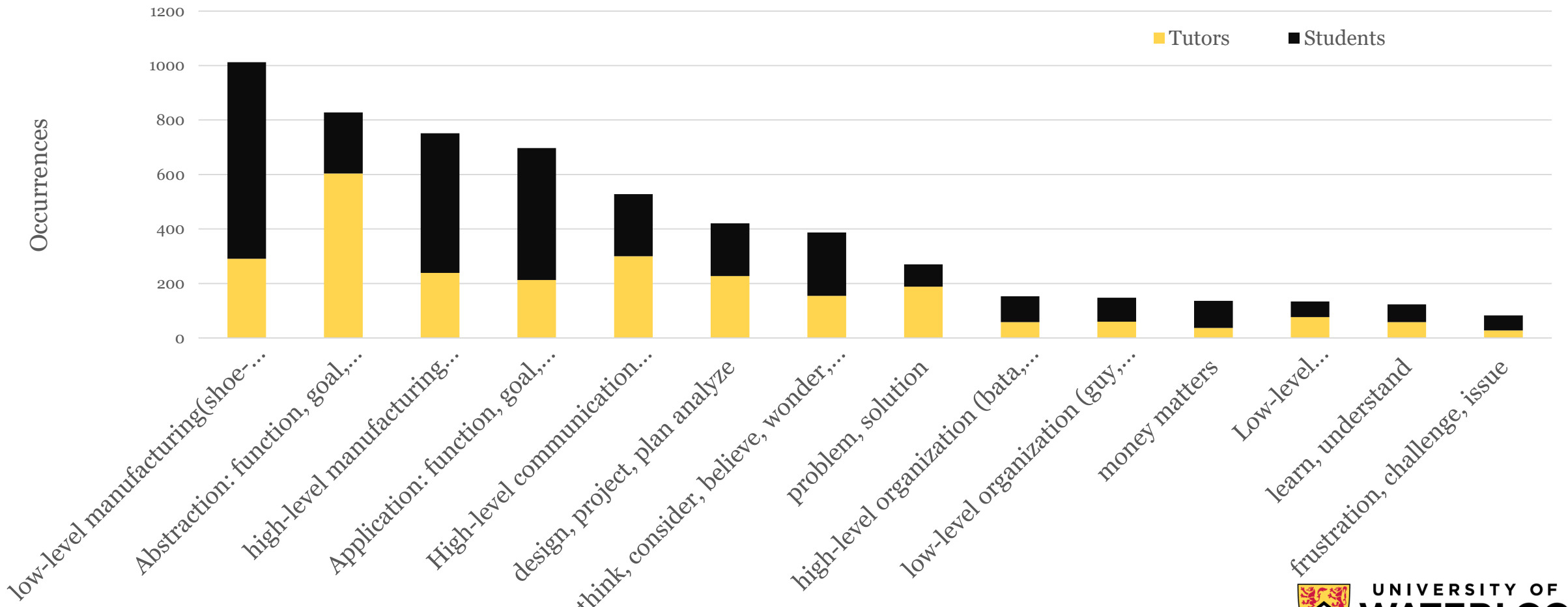
- Synchronous instruction via video conference
- Familiar technology

Disadvantages

- Related to connection quality

More formal analysis of learning sessions, in collaboration with Prof. John Gero

Phase 1: High-level analysis



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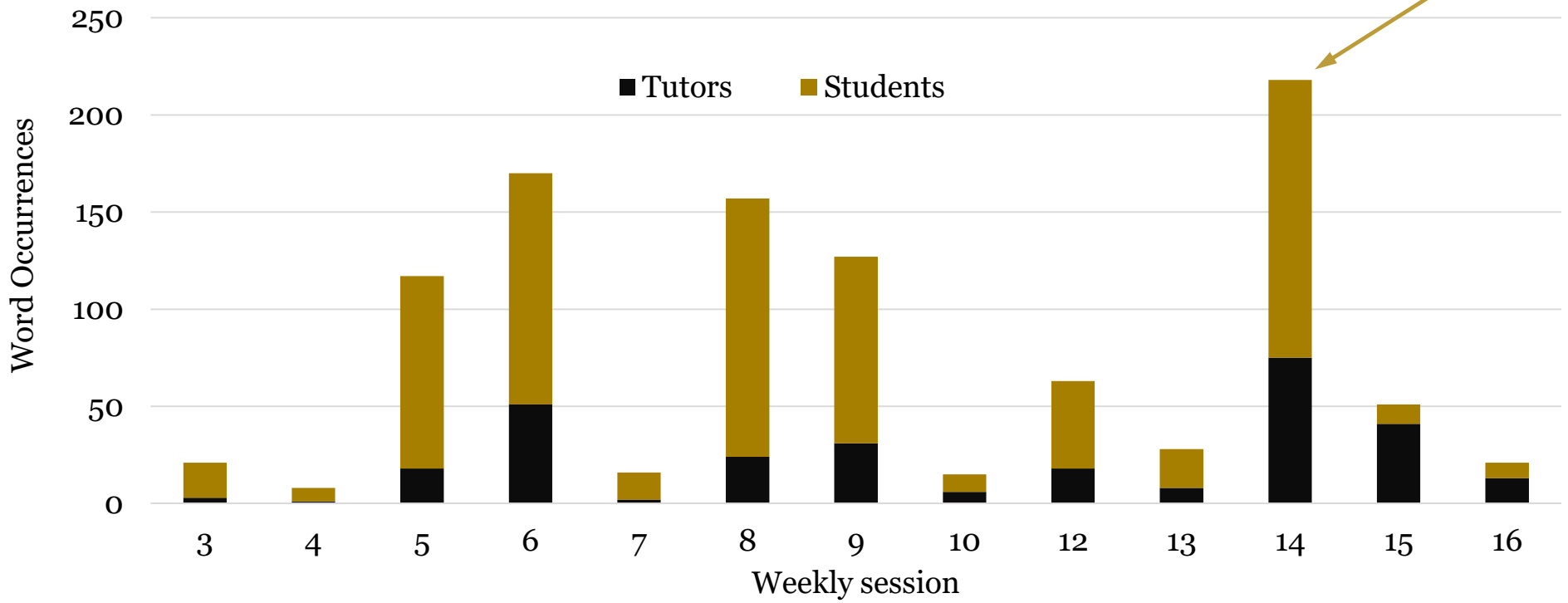
Phase 1: High-level analysis

Example: Occurrences of words related to "low-level" manufacturing (shoes, cement, mould, cast, cart, sock, fit, stretch, uppers, sew, sole, heel, etc.)



Students begin describing, unprompted, an unexpected result of testing on the production line

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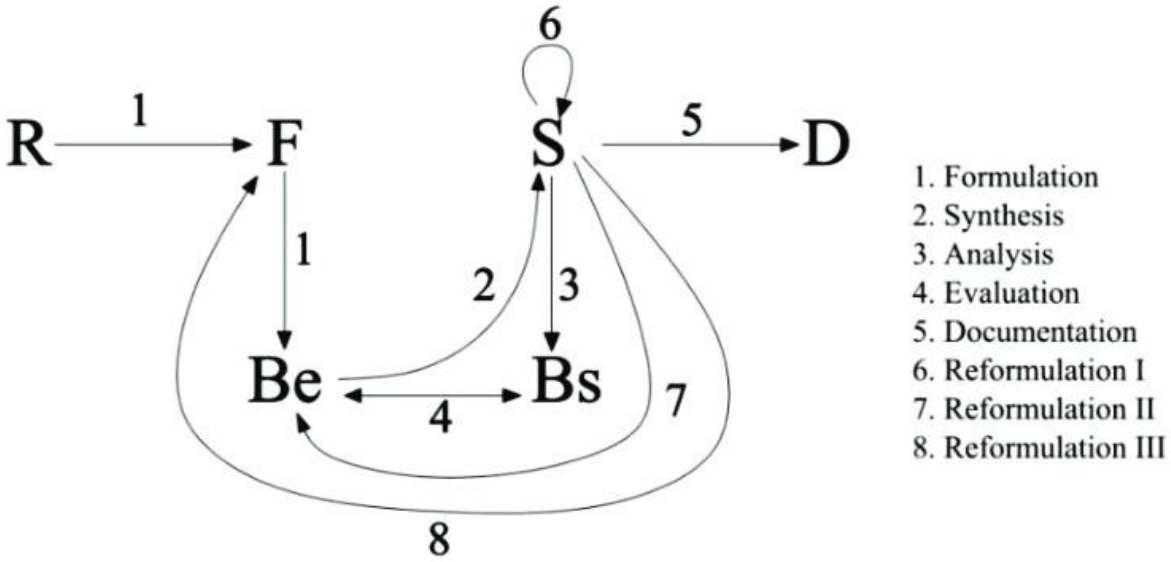
Phase 2: Applying Function-Behaviour-Structure (FBS) Ontology

- Axioms:

1. All **designs** can be represented in a uniform way
2. All **designing** can be represented in a uniform way



The FBS ontology (Gero and Kannengiesser 2004)

Students provided very positive feedback on their learning

Jordan, Pia, Caesar and Thomas

A second iCapstone pilot was undertaken with FULLSOUL Canada, a non-profit organization, placing students in Uganda

iCapstone-W18: FULLSOUL Interns in Uganda
Breanna, Lauren and Ryan

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